

# Low Temperature Mode (4 – 325 K)

## Operating Instructions for the Janis Top-Loading CCR (TLCCR)

### ESTIMATED TIMES TO REACH EQUILIBRIUM TEMPERATURES:

Cooling a cold CCR from 300-3.3K: ~1.5 hrs

### RECOMMENDED CONTROL SETUP

Sample Stick	Sample Channel	Control Channel	Temperature Range
Low Temperature	A	B	4-325 K
High Temperature	B	D	70-325 K
High Temperature	B	B*	4-325 K*

\* This mode relies on the sample well temperature to indicate the sample temperature.

NOTE: A thermal protection circuit will shut off the heater power if the coldhead (NOT the sample well) reaches 270 K (26° F). There is no visual display of this temperature sensor on the controller.

### SAMPLE STICK:

- 1) Select the sample stick that fits your experiment's temperature range.
- 2) Switch to "Low Temp (Exchange Gas)" on the heater selector box.
- 3) Use the table above to set up the Instrument Control Program (ICP) temperature control.
- 4) Enter the zone PID values for your sample stick into the Lakeshore controller. Use the table provided on top of the controller; refer to "Loading a PID Zone Table" for more instructions.

### LOADING AND CHANGING SAMPLES:

- 1) Adjust the vertical position of the sample by loosening the collar on the sample stick, moving the stick, and retightening the collar. For long tailed TLCCR, the distance from bottom of sample stick flange to center of beam is 140 cm (55.12 in).
- 2) Make sure that the 3-way valve, the outer vacuum valve, and safety valve are all properly closed. The 3-way valve is closed when it is pointing perpendicular to the gas and vacuum line. Ensure that all cables to the sample stick are disconnected.
- 3) Put 3-5 psi of helium gas on the gas inlet. Connect a rough vacuum pump to the vacuum port and establish a vacuum.
- 4) Connect the sample well to the vacuum by turning the 3-way valve towards the vacuum port. Open the safety valve, evacuate the sample well, and close the 3-way valve.
- 5) Unclamp the sample stick or sample well cover from the flange of the top loading CCR.
- 6) Turn the 3-way valve towards the gas inlet. **It is necessary to have constant flow of helium through the sample well to prevent air from entering during the sample change.**
- 7) Remove the sample stick or well cover from the CCR once the well's pressure gauge reads above zero and insert the sample stick.
- 8) Clamp the sample stick back to the displacer's flange. Pump the helium from the sample well by turning the 3-way valve towards the vacuum port.
- 9) Close the 3-way valve and safety valve.
- 10) Attach the cables onto the new sample stick.
- 11) Pump and purge the sample well three times by filling the well with helium to -5 psi and then pumping it out. **Leave -5 psi (<1 atm) of helium exchange gas in the sample well.**
- 12) Close all valves and disconnect the vacuum pump and helium gas.
- 13) The heater may turn off if the cables to the sample stick are unplugged. Verify that the heater is on at the controller; turn it on with the "Heater Range" button if necessary.

### SHUT DOWN:

- 1) Turn off the heater power on the temperature controller.
- 2) Turn off the compressor on the floor with the black drive switch on its front panel.

# High Temperature Mode (70 – 800 K)

## Operating Instructions for the Janis Top-Loading CCR (TLCCR)

### ESTIMATED TIMES TO REACH EQUILIBRIUM TEMPERATURES:

Warming from 300K-600K: ~30 min

Normal cooling down from 600-300K: ~4 hrs

### RECOMMENDED CONTROL SETUP

Sample Stick	Sample Channel	Control Channel	Temperature Range
Low Temperature	B	B	4-500K
High Temperature	D	D	70-800K

### SAMPLE STICK:

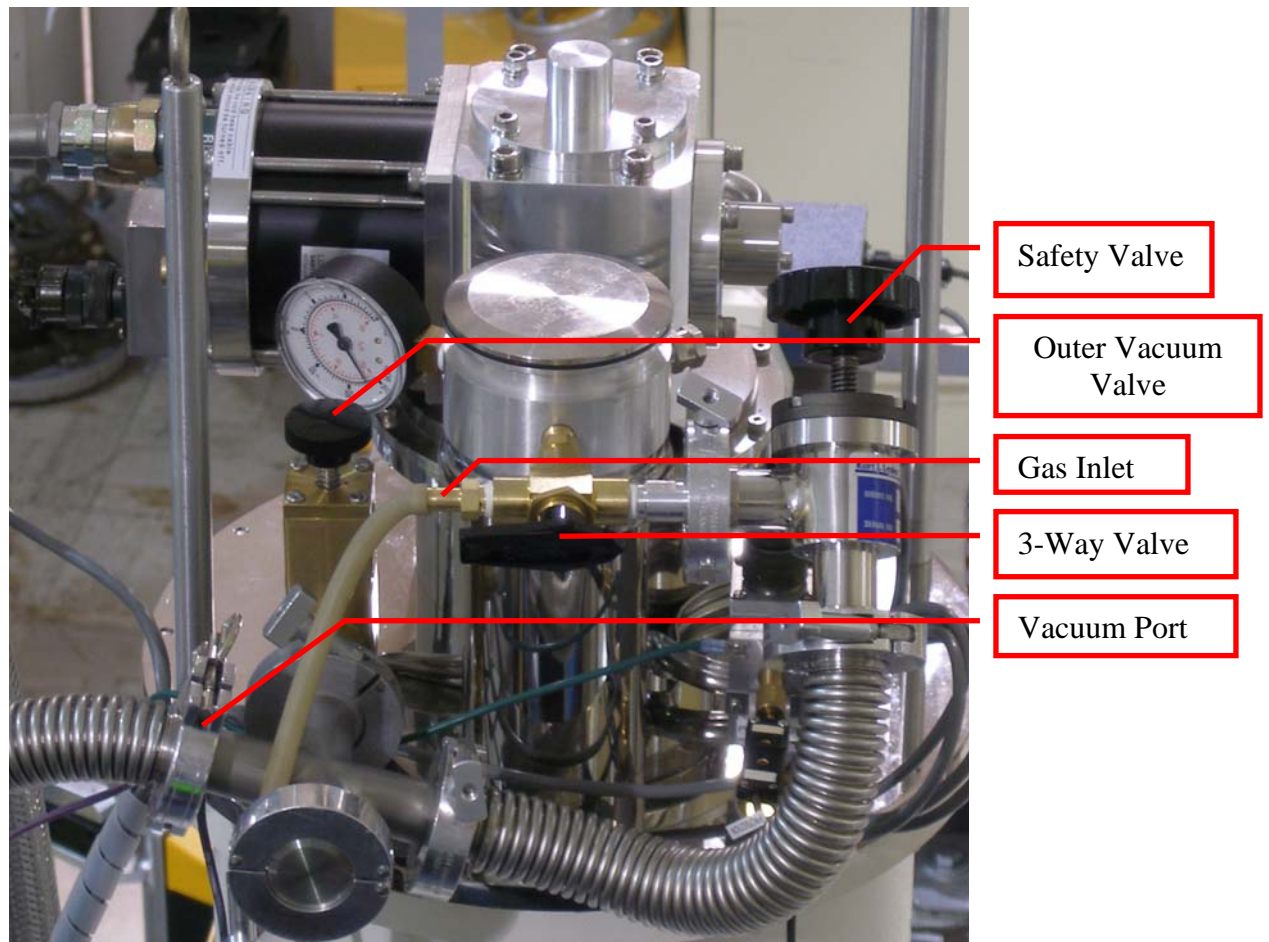
- 1) Select the sample stick that fits your criteria and switch to the “High Temp (Vacuum)” on the heater selector box.
- 2) Use the table above to set up the Instrument Control Program (ICP) temperature control for your sample stick choice.
- 3) Enter the zone PID values for your sample stick into the Lakeshore controller. Use the table provided on top of the controller; refer to “Loading a PID Zone Table” for more instructions.

### LOADING AND CHANGING SAMPLES

- 1) Adjust the vertical position of the sample by loosening the collar on the sample stick, moving the stick, and retightening the collar. For long tailed TLCCR, the distance from bottom of sample stick flange to center of beam is 140 cm (55.12 in).
- 2) Make sure that the 3-way valve, the outer vacuum valve, and safety valve are all properly closed. The 3-way valve is closed when it is pointing perpendicular to the gas and vacuum line. Also ensure that all cables to the sample stick are disconnected.
- 3) Put 3-5 psi of helium gas on the gas inlet. Connect a rough vacuum pump to the vacuum port and establish a vacuum.
- 4) Connect the sample well to the vacuum by turning the 3-way valve towards the vacuum port. Open the safety valve, evacuate the sample well, and close the 3-way valve.
- 5) Unclamp the sample stick or sample well cover from the flange of the top loading CCR.
- 6) Connect the sample well to the helium gas line by turning the 3-way valve towards the gas inlet. **It is necessary to have constant flow of helium through the sample well to prevent air from entering during the sample change.**
- 7) Remove the sample stick or well cover from the CCR once the well's pressure gauge reads above zero and insert the sample stick.
- 8) Clamp the sample stick back to the displacer's flange. Pump the helium from the sample well by turning the 3-way valve towards the vacuum port.
- 9) Close the 3-way valve and safety valve.
- 10) Attach the cables onto the new sample stick.
- 11) Pump and purge the sample well three times by filling the well with helium to -5 psi and then pumping it out. **When finished, be sure to leave on a turbo pump and continuously pump on the sample well to maintain an adequate vacuum.**
- 12) Disconnect the helium gas.
- 13) The heater may turn off if the cables to the sample stick are unplugged. Verify that the heater is on at the controller; turn it on with the “Heater Range” button if necessary.

### SHUT DOWN

- 1) Turn off the heater power on the temperature controller.
- 3) Once the temperature at channel D is 300 K or lower, turn off the compressor on the floor with the black drive switch on its front panel.



## Sensor Setup Chart

	Exchange Gas		Vacuum	
	Sample	Control	Sample	Control
Low Temp Sample Stick	A	B	A	A
	4-325K		4-450K	
High Temp Sample Stick	D, or B*	B	D	D
	70-325K, 4-325K*		70-800K	



Preferred modes of operation



Extended range modes of operation

\* At temperatures below 70 K, there is very little temperature gradient between the sample well and the sample stick. Thus, sensor A provides an accurate determination of the sample temperature in a range that the sample stick sensor D is not able to read.